PATENT APPLICATION
Mo7292C
MD01-109B-LS-C

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION OF	)
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RICHARD R. ROESLER ET AL	) GROUP NO.: 1712
	)
SERIAL NUMBER: 10/690,931	) EXAMINER: Margaret G. Moore
	)
FILED: October 22, 2003	)
	)
TITLE: POLYETHER URETHANES CONTAINING ONE REACTIVE SILANE GROUP AND THEIR USE IN MOISTURE-CURABLE POLYETHER URETHANES	)

DECLARATION UNDER 37 CFR 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I Richard R. Roesler declare that:

1. I am one of the inventors who, on October 22, 2003, filed the above-identified application Serial No.10/690,931.

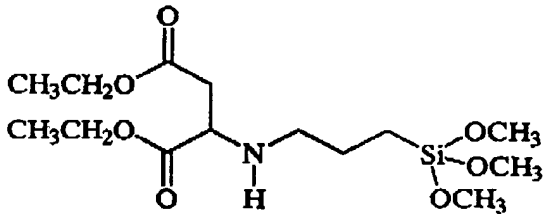
2. The invention described in the above-identified application was reduced to practice prior to May 31, 2002, the filing date of U.S. Application Ser. Nos. 10/160,463 and 10/160,361, the parent applications of U.S. Application Ser. Nos. 10/690,955 and 10/690,751, respectively.

3. As evidence of this reduction to practice, a Memorandum of Invention was filed with the Patent Department at Bayer Polymers LLC, Pittsburgh, PA on October 30, 2001. This Memorandum of Invention was filed with the United States Patent and Trademark Office (USPTO) with a previous ("first") declaration.

4. As noted in the Memorandum of Invention, experimental work was carried out during 2001 and recorded on notebook pages 4039373, 4039377, 4042581-2, 4048214 and 4048216. These notebook pages were submitted with the previous ("second") declaration.

5. The presently claimed polyether polyurethane composition contains 40-80% by weight of a polyether polyurethane containing one reactive silane and one or more polyether segments having a number average molecular weight of 1,000 to 15,000 and a maximum total degree of unsaturation of less than 0.04 meq/g, wherein the reactive silane groups are incorporated by the reaction of an isocyanate group with a compound corresponding to the compound shown in formula 1.

6. Illustrated below is the chemical formula of the reactive silane XP-7139:



XP-7139

7. As further evidence of reduction to practice prior to May 31, 2002, submitted herewith is a copy of the notebook page (NB 682095) that describes one preparation of SFA-1. The patent application describes preparation of a different lot. Both lots have the same equivalent weight of 366, the same equivalent weight as the material used to prepare the resin of Example 3 (shown on NB 4039377, also submitted herewith).

Also enclosed is a copy of the XP 7139 product registration sheet. The formulation is essentially the same as SFA 1, except as a commercial product the XP 7139 has a stabilizer added at 0.5 part per hundred of resin. The designation XP 7139 is used when the material has the stabilizer or not. Also, the equivalent weight of the registered product is listed as 351.4. This is the theoretical equivalent weight,

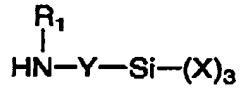
as can be calculated from the theoretical equivalent weights of the ingredients as shown on NB 682095. In practice some of the amine is converted to amide resulting in a product with a slightly lower amine content and so a slightly higher equivalent weight. These notebook pages and product registration sheet establish that the SFA1 described in the application is the same compound as XP7139 described on the notebook pages submitted herewith and in previous declarations.

8. In the interview of April 7, 2005 the Examiner requested specific information on how secondary aminosilanes, in general, are beneficial for preparing polyether monosilane and evidence that Applicants are entitled to the full scope of R_1 in Formula I. This evidence is provided in the following information.

Manufacturers have long known that silane terminated polyurethane resins (sold under the common name designation SPUR or STP) prepared from aminopropyl silane have high viscosity compared to SPURs prepared from an N-substituted aminopropyl silane. For example, a SPUR prepared from Acclaim 12200 polypropylene glycol diol (6000 equivalent weight), isophorone diisocyanate and aminopropyl trimethoxy silane has a viscosity in excess of 190,000 mPa·sec, whereas a homologous product prepared from N-phenylaminopropyl trimethoxy silane has a viscosity of 78,000 mPa·sec, a 59% reduction. The effect in a monool is less because only one urethane group is present, but is still present. For example, a SPUR prepared from a 6000 equivalent weight polypropylene glycol monool, isophorone diisocyanate and aminopropyl trimethoxy silane has a viscosity of 15,000 mPa·sec, whereas a homologous product prepared from N-phenylaminopropyl trimethoxy silane has a viscosity of 10,000 mPa·sec, a 35% reduction.

Not many N-substituted aminopropyl silanes are available commercially. Three that are include N-butyl, N-cyclohexyl and N-phenyl substituted aminopropyl trimethoxy silane. The disadvantage of the commercially available materials is that they are prepared from trimethoxy silane and N-substituted allyl amine. This process is very expensive. In addition the N-phenyl derivative is yellow and the resultant SPUR is not suitable for commercial applications.

The assignee of the present application has developed an inexpensive process to manufacture secondary amines, and this process was used to prepare an inexpensive N-substituted aminosilane, namely, the 3-(N-2-succinylamino)-propyl trimethoxy silane. This material was used to demonstrate the discovery of the utility of N-substituted aminosilanes in the invention. As would be recognized by one skilled in the art, any N-substituted aminosilane would be useful. Claim 1 expressed this by the broader definition of R_1 as shown in the structure below.



9. A range of 40-80% monosilane content was chosen based on the following reasoning. The table below gives a performance matrix for two industrial sealants, that is market needs.

Performance properties of industrial sealants		
	General construction	High performance
Elongation, %	>200	>400
Tensile strength, psi	>150	>200
100% modulus, psi	<150	<100
Tear strength, pli	>20	>20

The following table was excerpted from the patent application:

Sealant Properties							
Ex. No.	Disilane STP	Mono-silane STP	Disilane/ Mono-silane Ratio	Die-C Tear (pli)	Ultimate Tensile Strength (psi)	Modulus @ 100% Elongation (psi)	Elonga-tion (%)
5	1	3	80:20	28	262	144	239
6	1	3	60:40	23	216	122	217
7	1	3	40:60	21	169	78	262

The table demonstrates that an increase of the monosilane content up to 60% in the formulated sealants, gave sealants with properties that met the performance needs of the industrial sealant industry. At the time the invention was reduced to practice, Applicants believed that formulations with more than 60% monosilane would meet market needs, and it was thought that 80% monosilane content would work as well. At the time the invention was reduced to practice, it was known that formulations with 90% and above monosilane content would not work, as the films were too soft and sticky to be of value.

10. I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing therefrom.

Signed at Pittsburgh, Pennsylvania, this 14th day of April, 2005.

Richard R. Roesler